Some Groundwater Quantity Concerns in the Central Sands

The Law of the Budget

Rich Uncle

Salary

$ In - $ Out = ± $ Balance

Birthday money from Grandma

The Law of the Budget

Mortgage

$ In - $ Out = ± $ Balance

Groceries

Beer

Kid's College Tuition

The Law of the Groundwater Budget

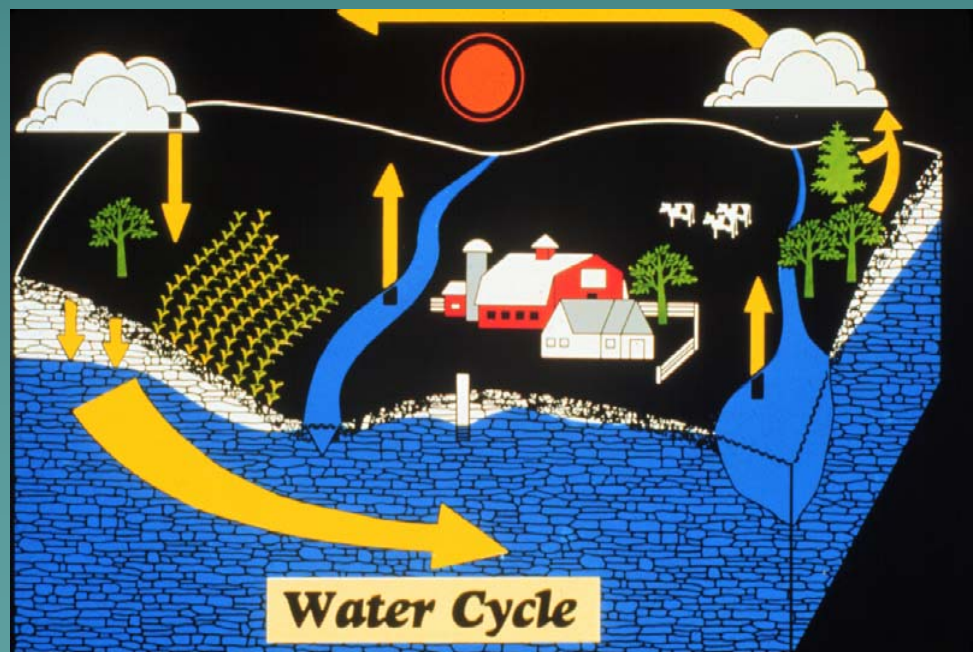
Recharge from precipitation

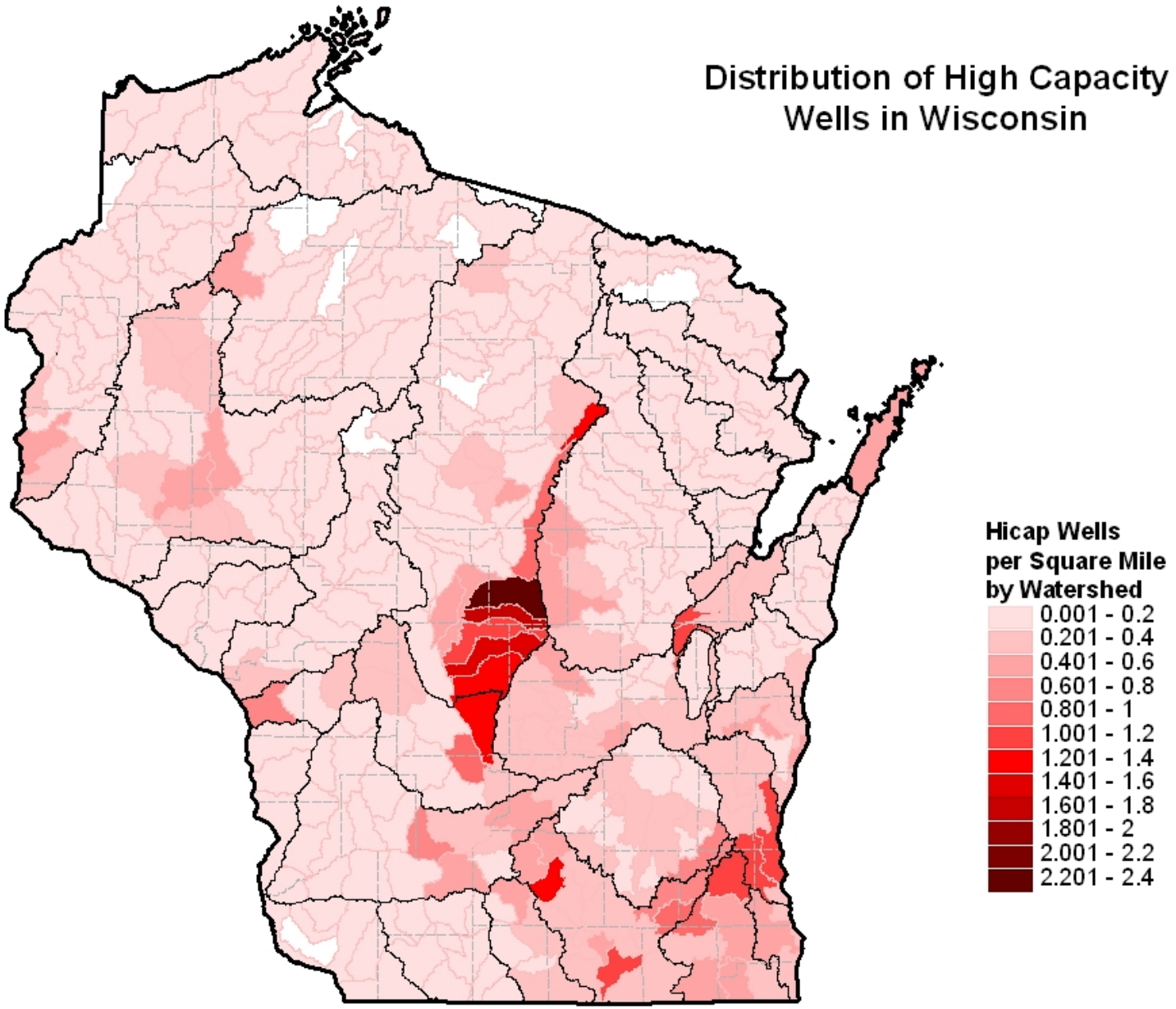
Rise / fall of the water table

Water In – Water Out = ± Balance

Discharge to streams

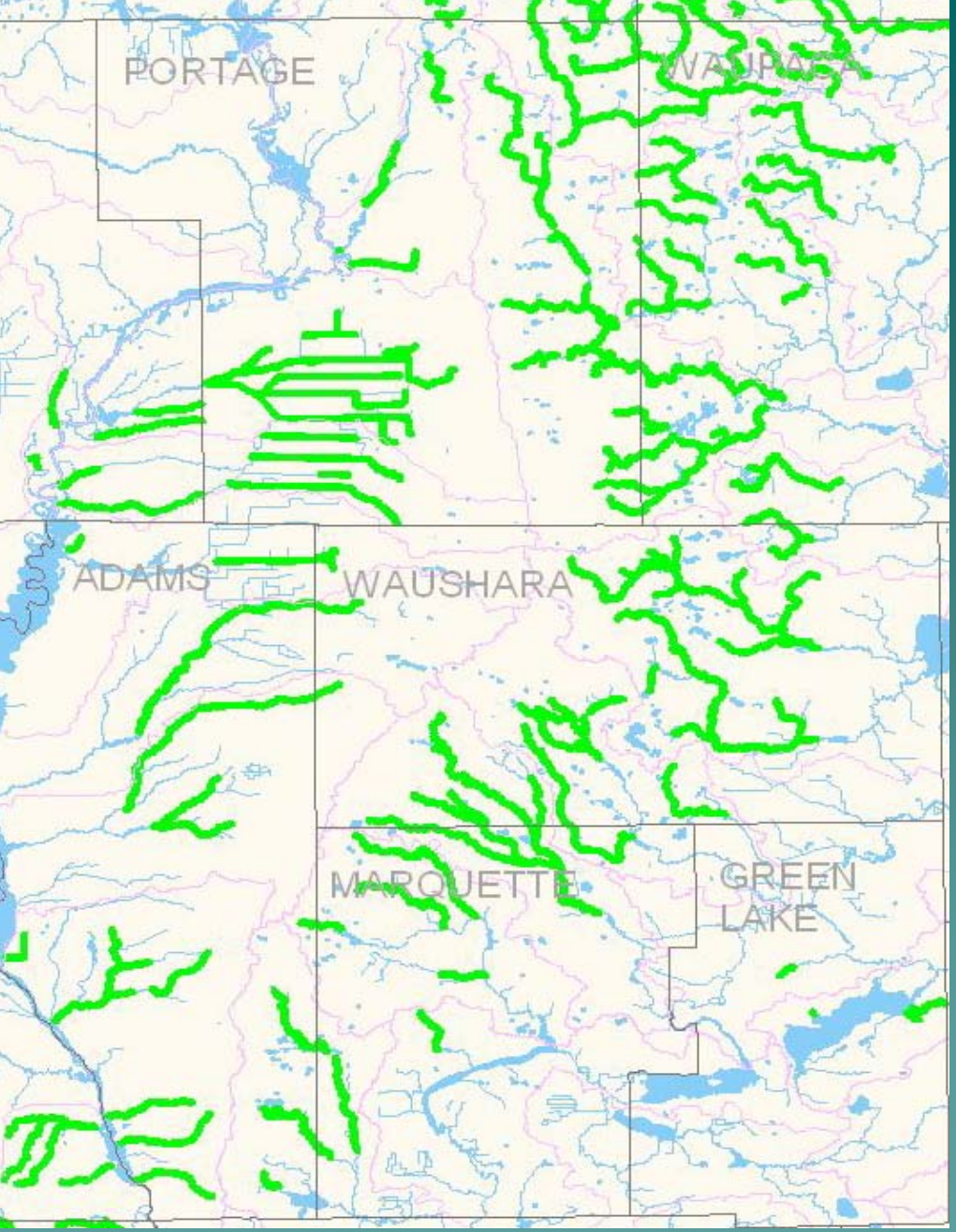
Pumping from wells




Distribution of High Capacity Wells in Wisconsin
Hicap Wells per Square Mile by Watershed
0.001 - 0.2
0.201 - 0.4
0.401 - 0.6
0.601 - 0.8
0.801 - 1
1.001 - 1.2
1.201 - 1.4
1.401 - 1.6
1.601 - 1.8
1.801 - 2
2.001 - 2.2
2.201 - 2.4

IPMENT

WISCONSIN



www.anglingmatters.com

Removal of Woody Streambank Vegetation to Improve Trout Habitat

Technical Bulletin
DEPARTMENT OF NATURAL RESO
Madison, W

Flow = Fish !

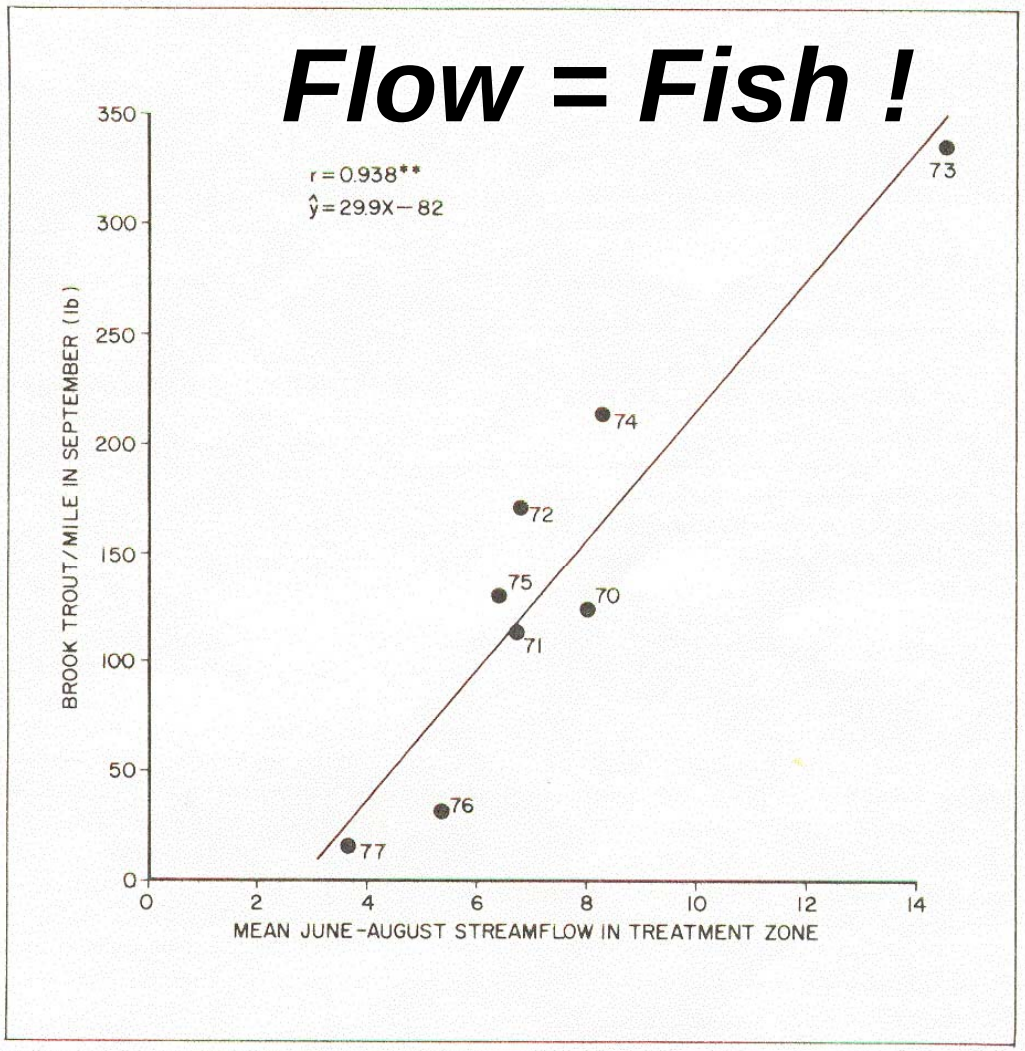
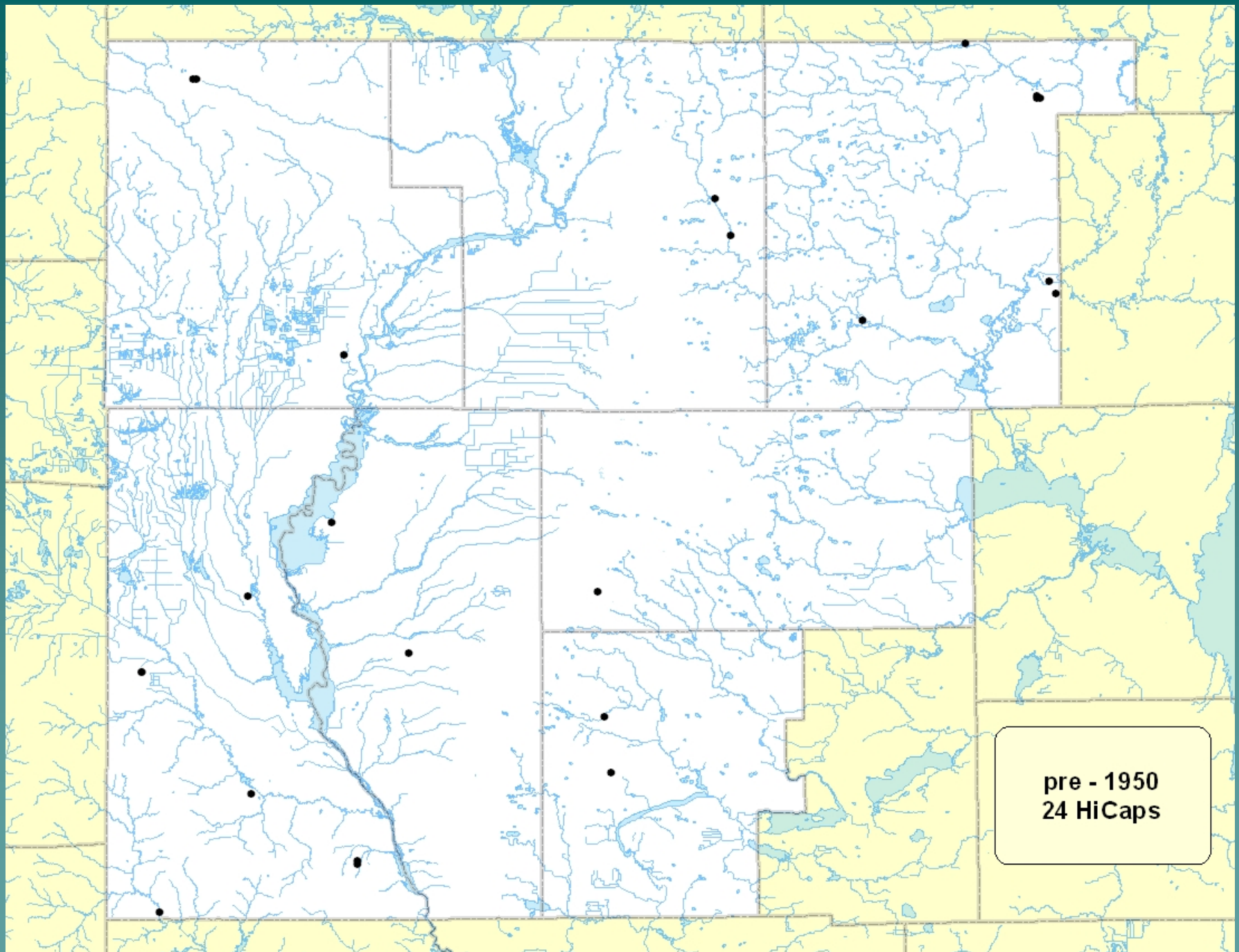


FIGURE 24. *Relation of summer discharge to fall trout-carrying capacity in the Treatment Zone in the Little Plover River during 1970-77.*

Todd Oestrich, www.flyfishingwis.com/ html/central_wis.html

Jeff Dimick, University of Wisconsin – Stevens Point


pre - 1950
24 HiCaps

Ed L. Avery

D. Knight

WATER ON THE LAND

Watershed Center 6.

Hydrology of the Little Plover River Basin Portage County, Wisconsin And the Effects of Water Resource Development

GEOLOGICAL SURVEY WATER-SUPPLY PA

Prepared in cooperation with the Wisconsin Conservation Department and the University of Wisconsin Geological and Natural History Survey

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

EFFECTS OF IRRIGATION ON STREAM

IN THE

CENTRAL SAND PLAIN OF WISCONSI

By
E. P. Weeks and H. G. Stangland

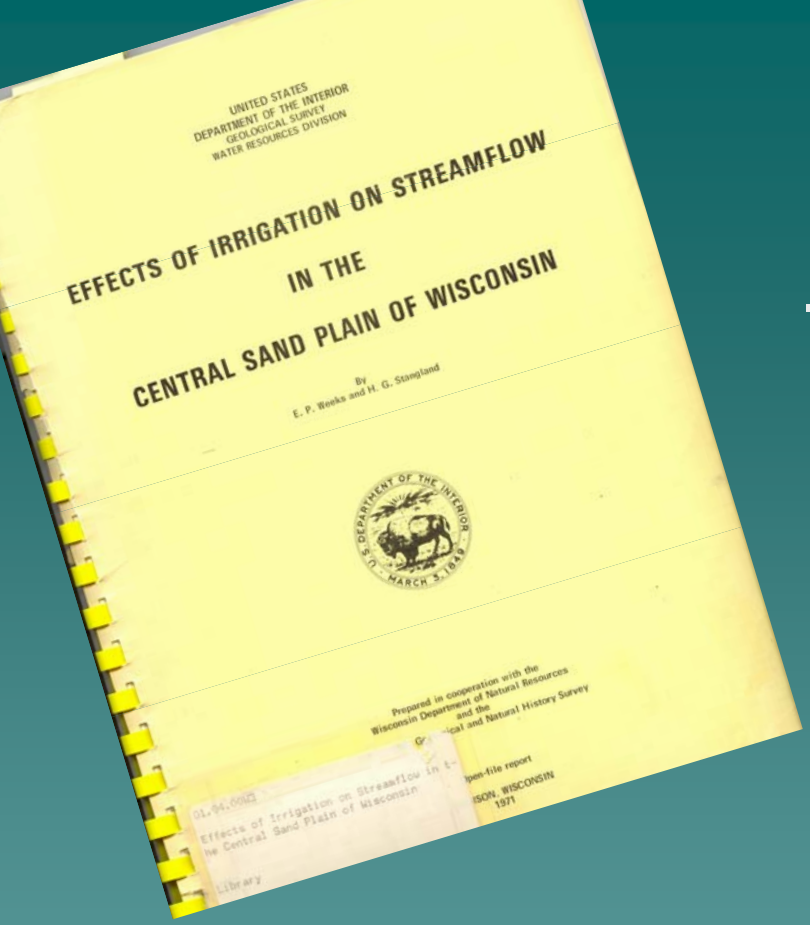
economy for many years. Along with these amenities, however, come a series of potential adverse impacts that demand careful attention before the current rate of irrigation progresses. Degradation of fish and wildlife habitats, drainage of extensive wetland environments, and regional declines in groundwater levels and streamflows are some of the major potential impacts needing immediate investigation.

RTMENT OF THE INTERIOR
RCH 3, 1849

eration with the
of Natural Resources
the
Natural History Survey

eport

ON, WISCONSIN
1971



Effects of irrigation

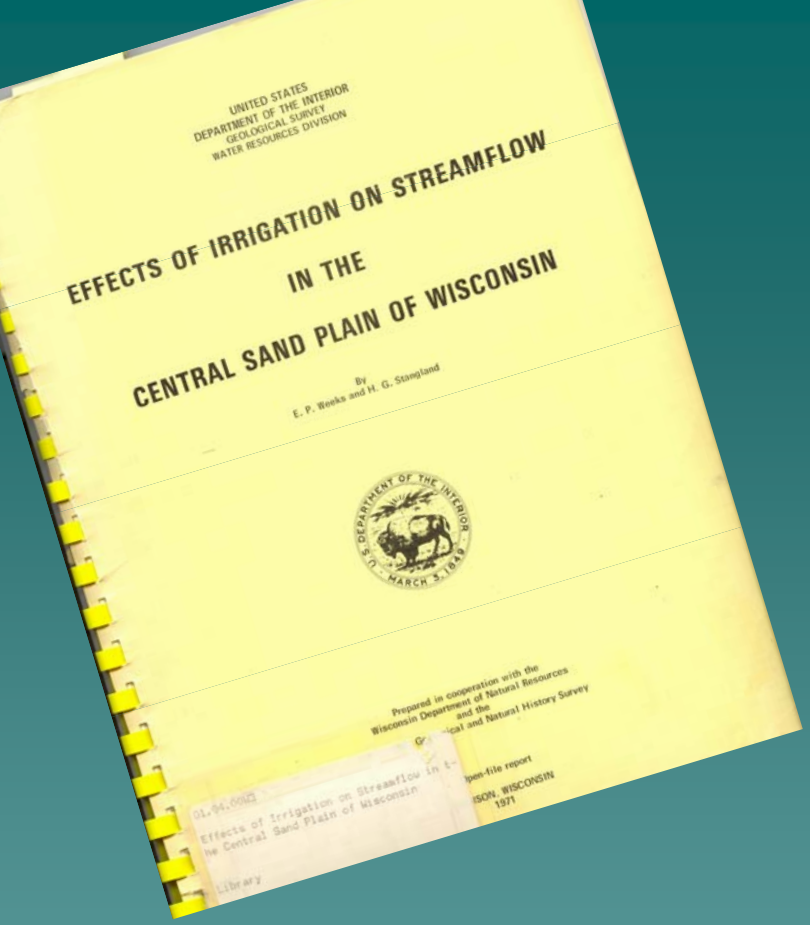
1970 –1/4 of the area irrigated

- normal summer stream loss:
25-30%

- normal summer water decline:
½ foot

- drought stream loss:
70-90%

- drought water decline:
2-3 feet



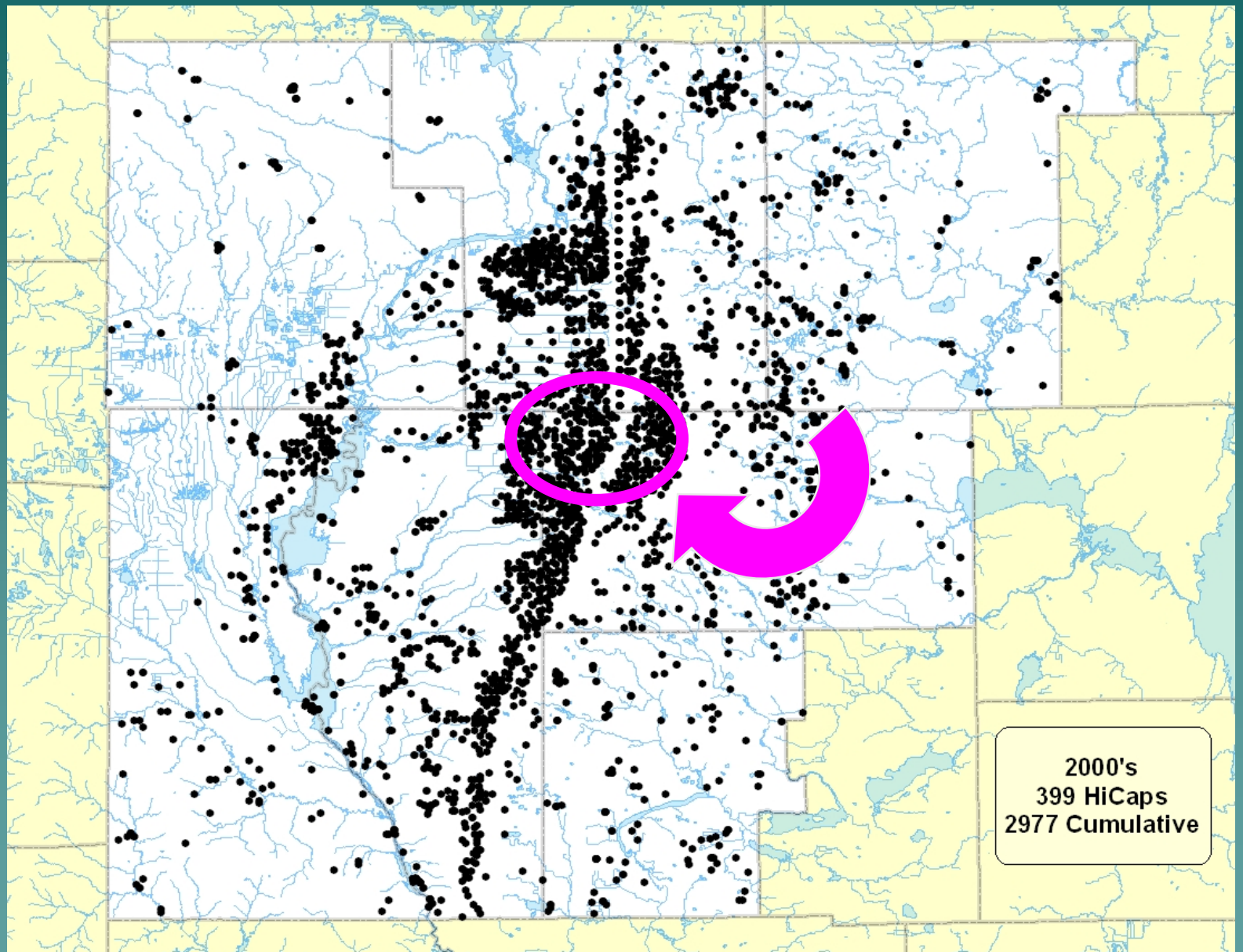
Effects of irrigation

<u>50% of area irrigated</u>

-drought stream loss:
100%

- drought water decline:
4 - 5 feet

Long Lake, Waushara Co.



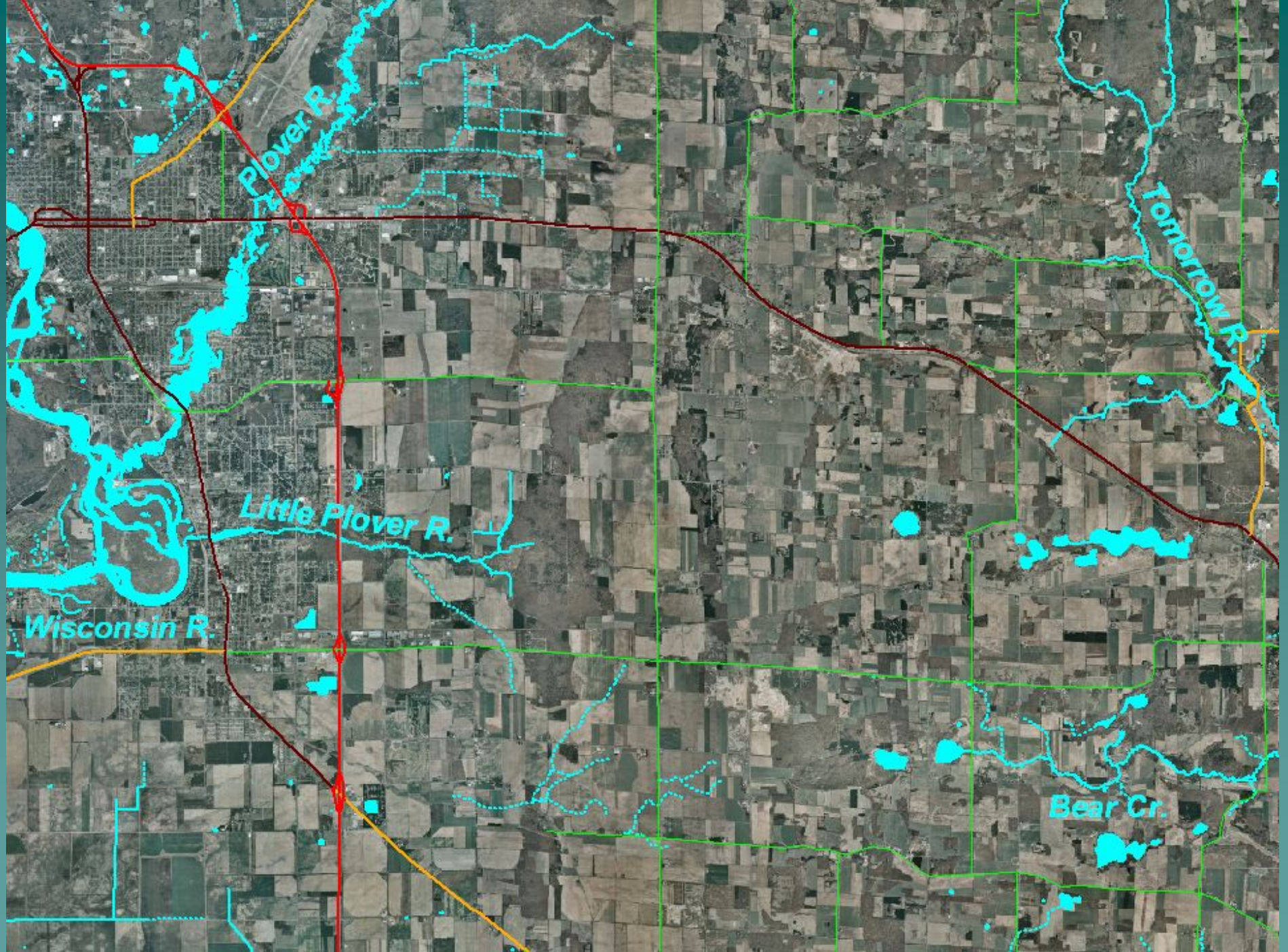
1950s

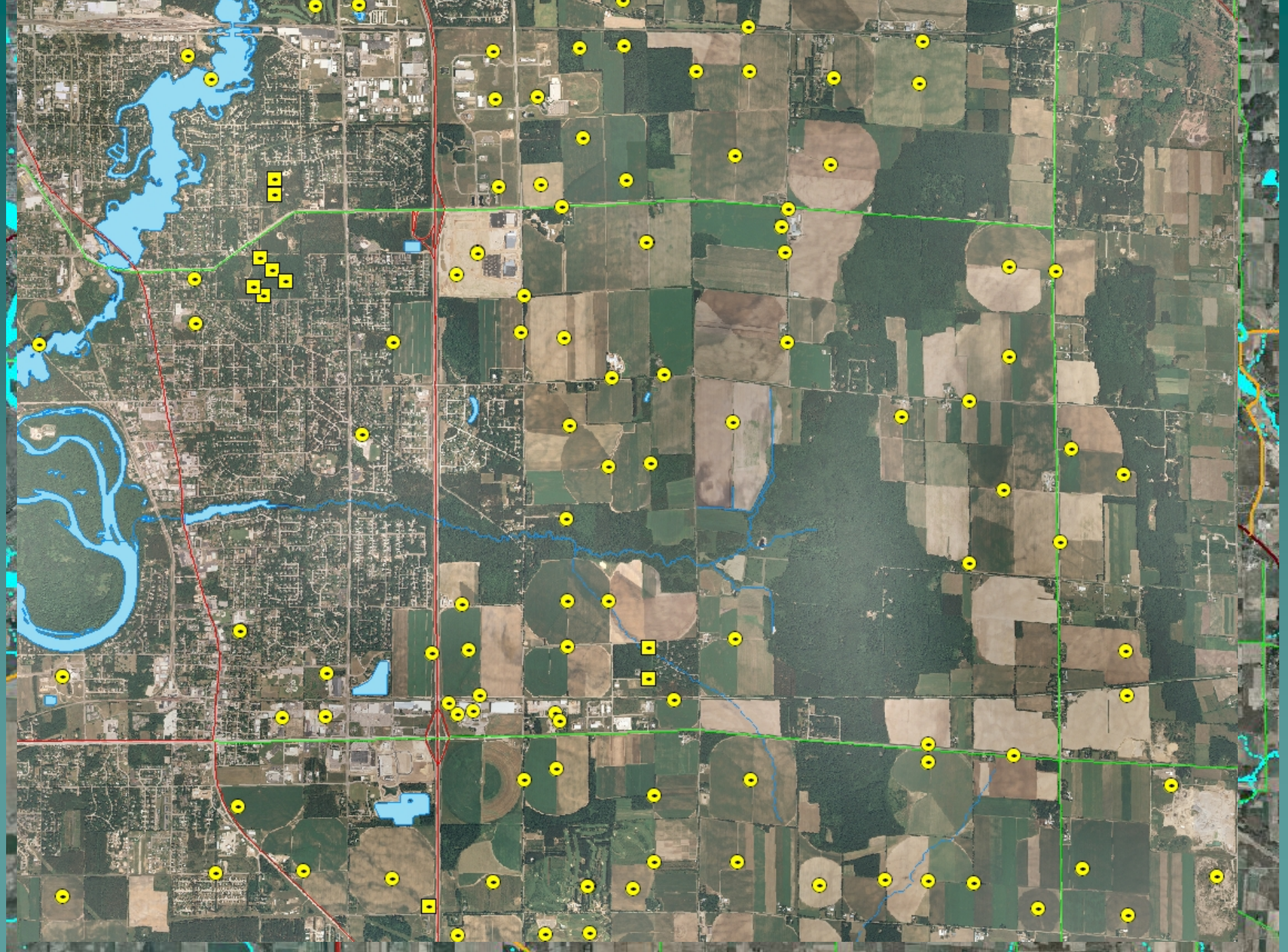
1994

Spring 2006

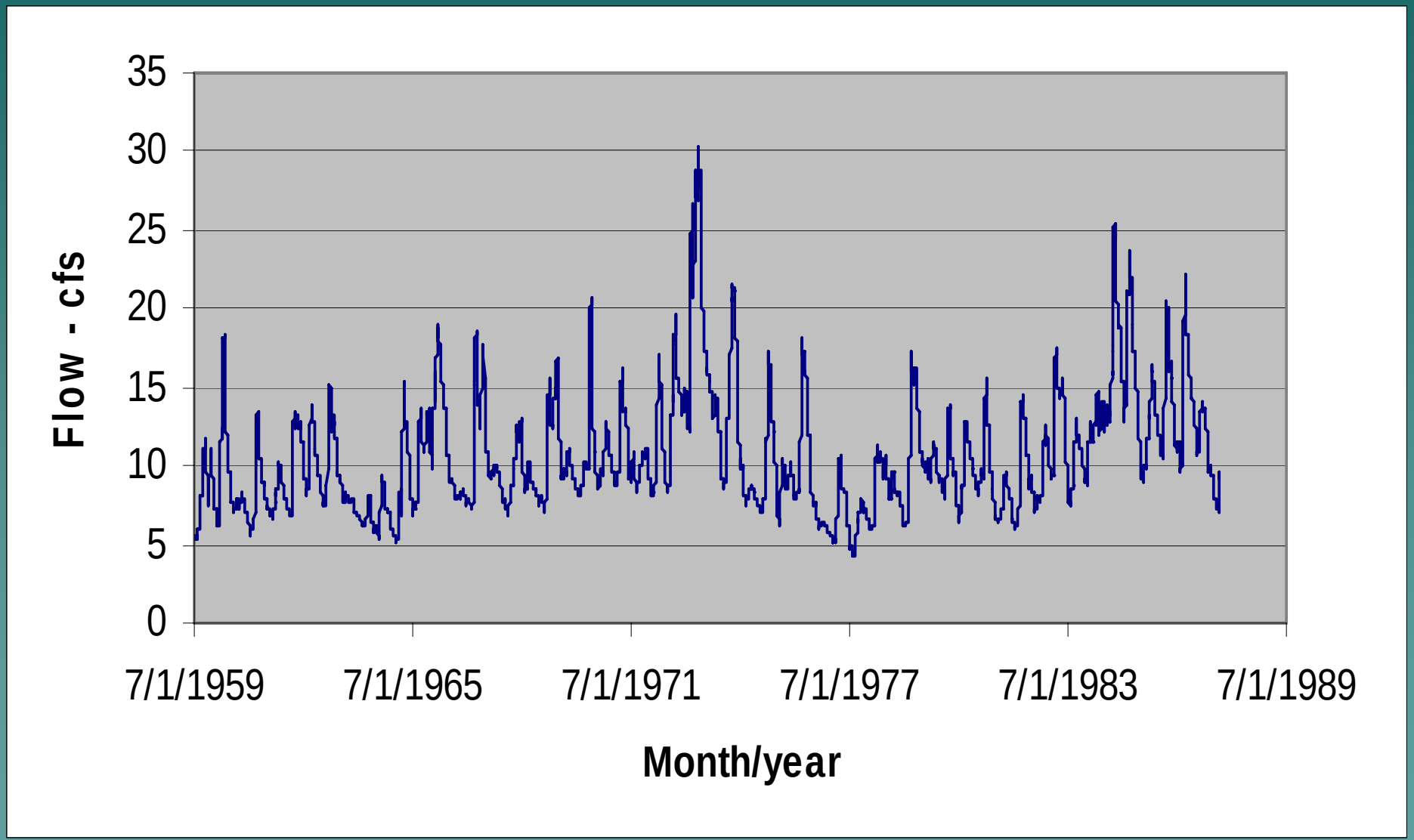
July 2006

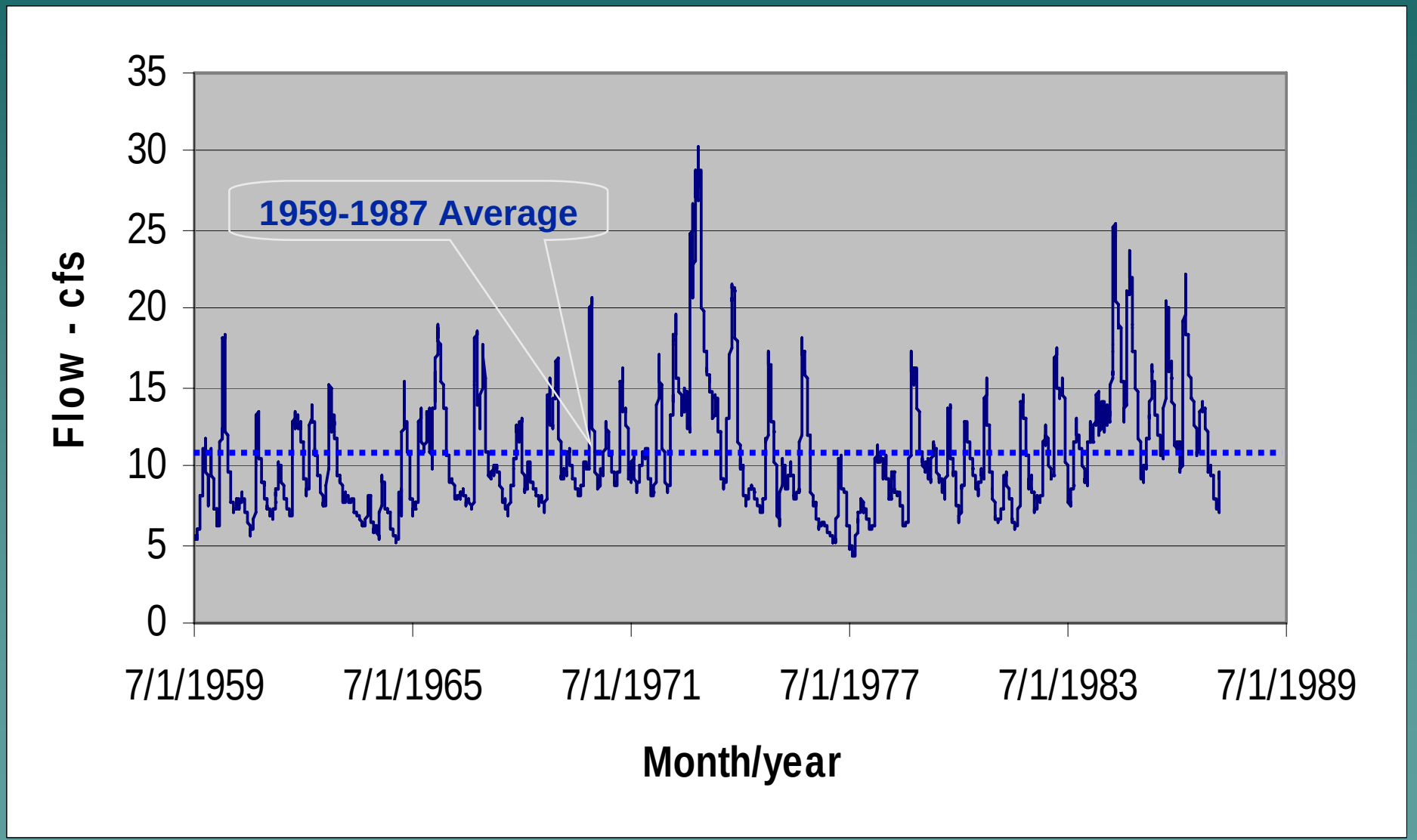

LITTLE PLOVER RIVER
FISHERY AREA

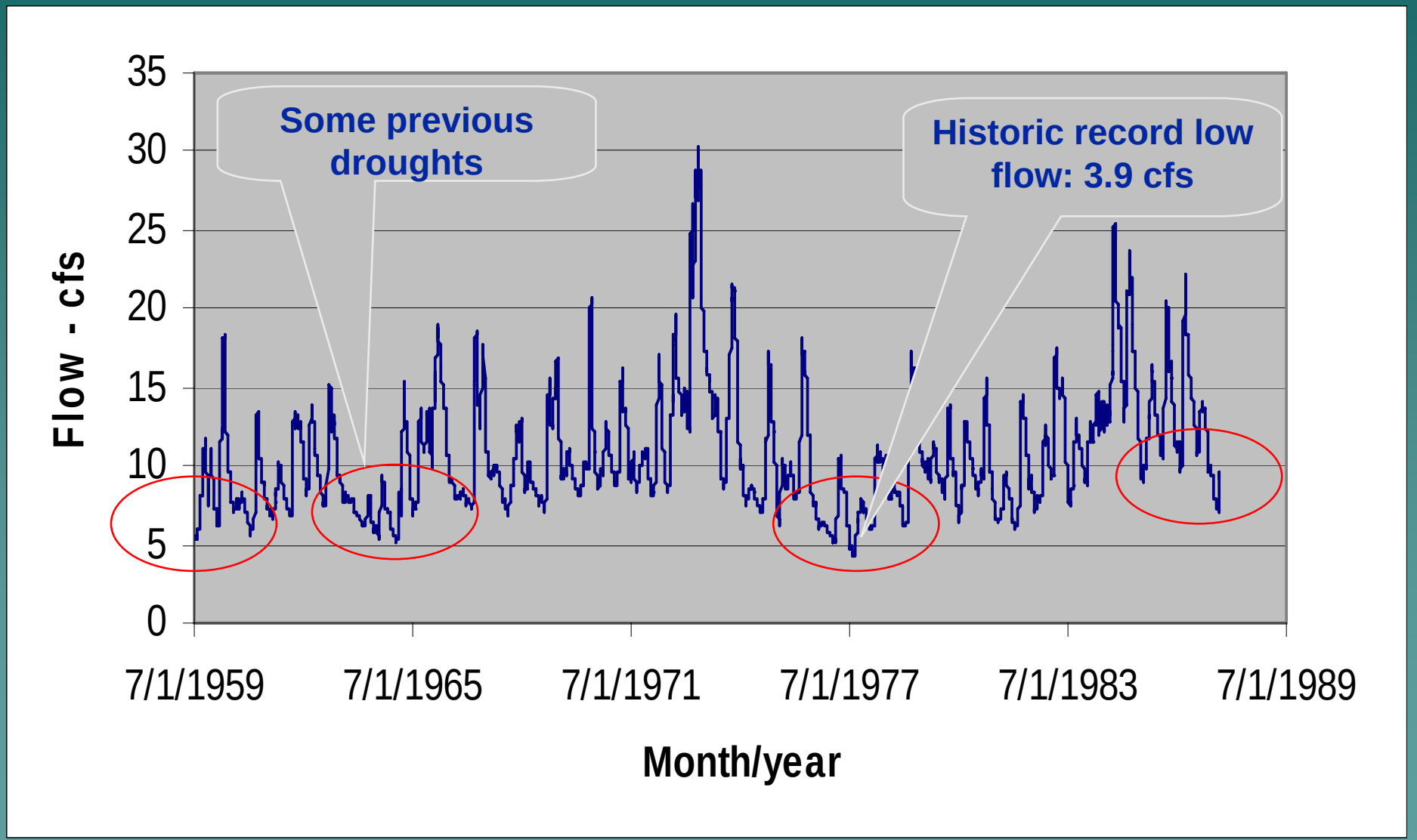

Plover R.
Tomorrow R.
Little Plover R.
Wisconsin R.
Bear Cr.



Little Plover @ Hoover: 1959-1987

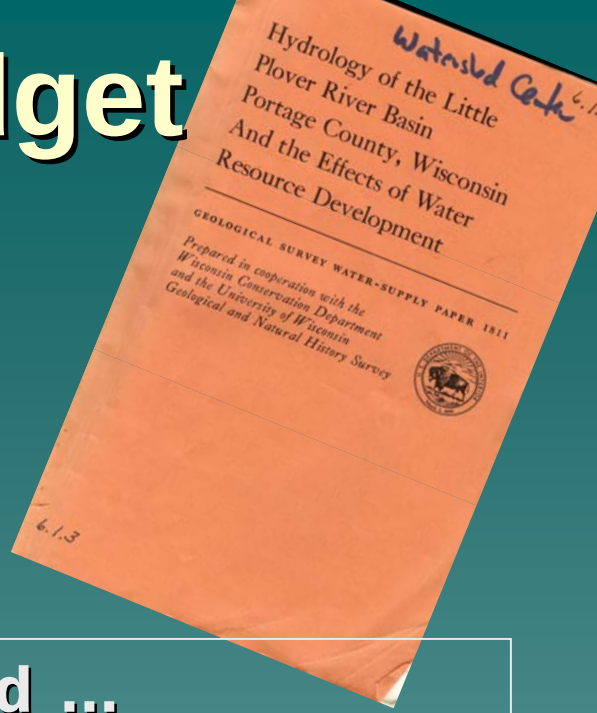



35
30
25
20
15
10
5
0
Flow - cfs
1959-1987 Average
7/1/1959
7/1/1965
7/1/1971
7/1/1977
7/1/1983
7/1/1989
Month/year


Some previous droughts
Historic record low flow: 3.9 cfs
Flow - cfs
35
30
25
20
15
10
5
0
7/1/1959
7/1/1965
7/1/1971
7/1/1977
7/1/1983
7/1/1989
Month/year

L. Plover Water Budget

Weeks et al., 1962



Water in: 31-32 inches

Water out:

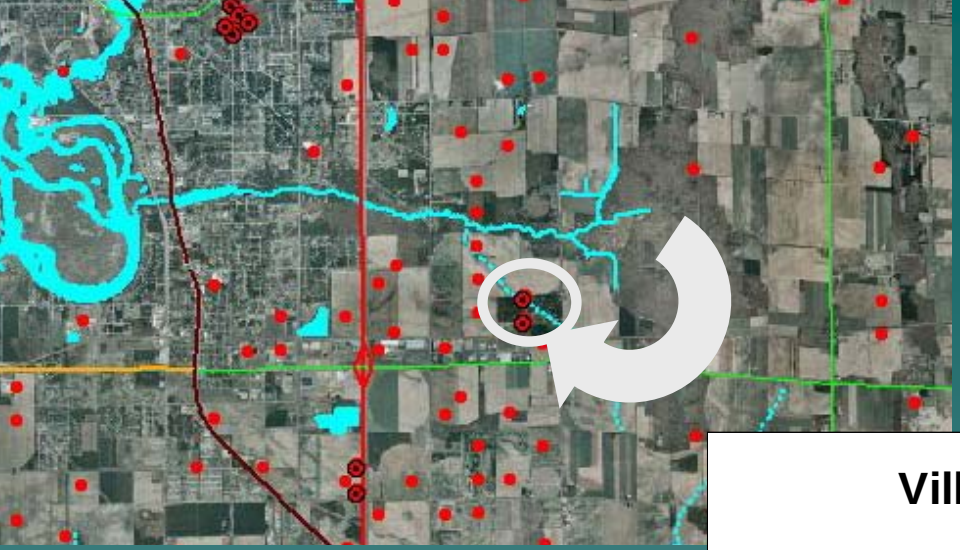
Surface runoff: 1”

Non-irrigated land ...		Irrigated land ...	
ET:	20-22”	ET:	24-26”
GW runoff:	9-10	GW recharge:	5-6”

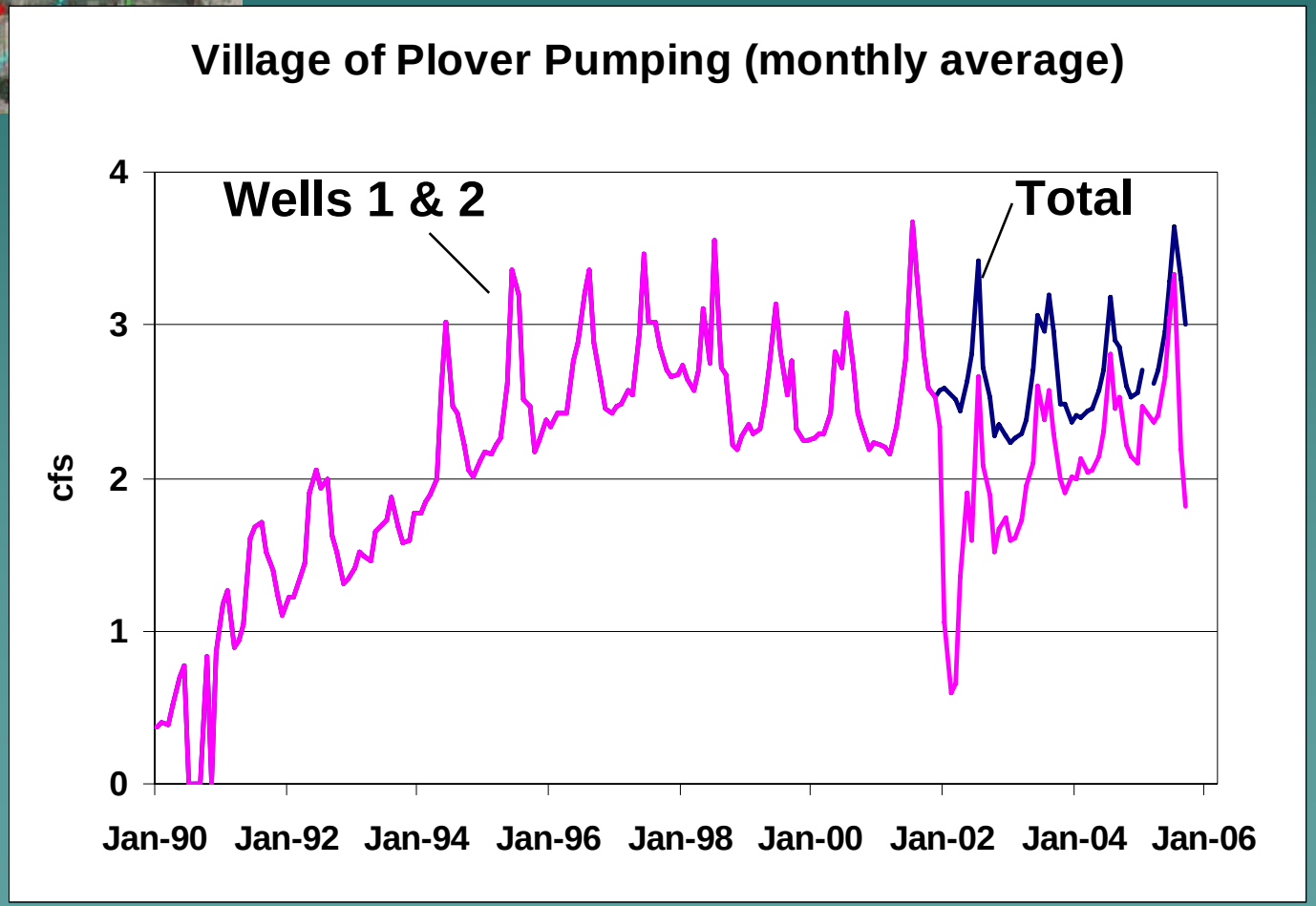
Predicted impacts of irrigation (current, normal):

-Average annual baseflow loss: 9%

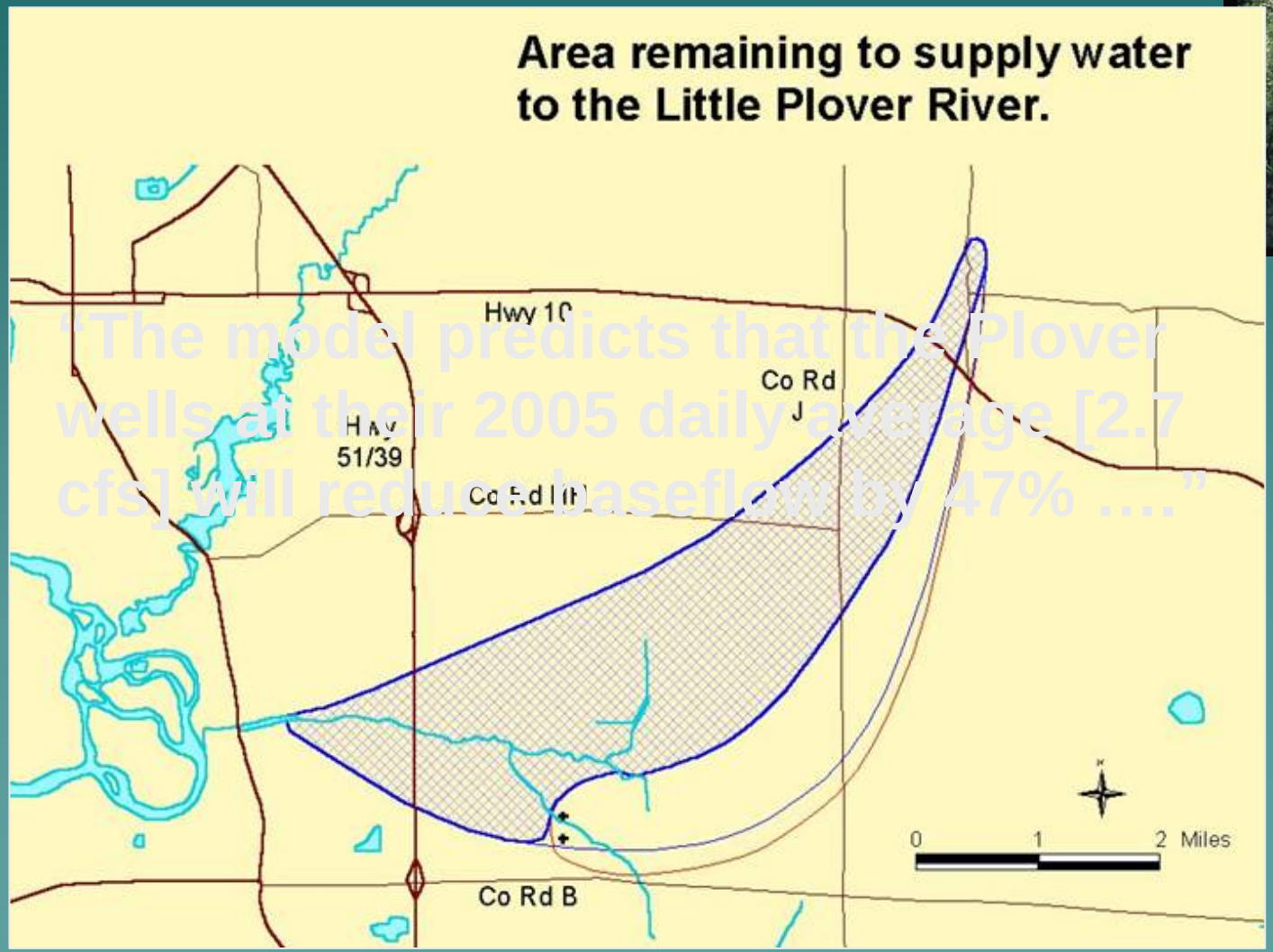
-Summer flow loss due to irrigation: > 20%



Effects of V. Plover Wells

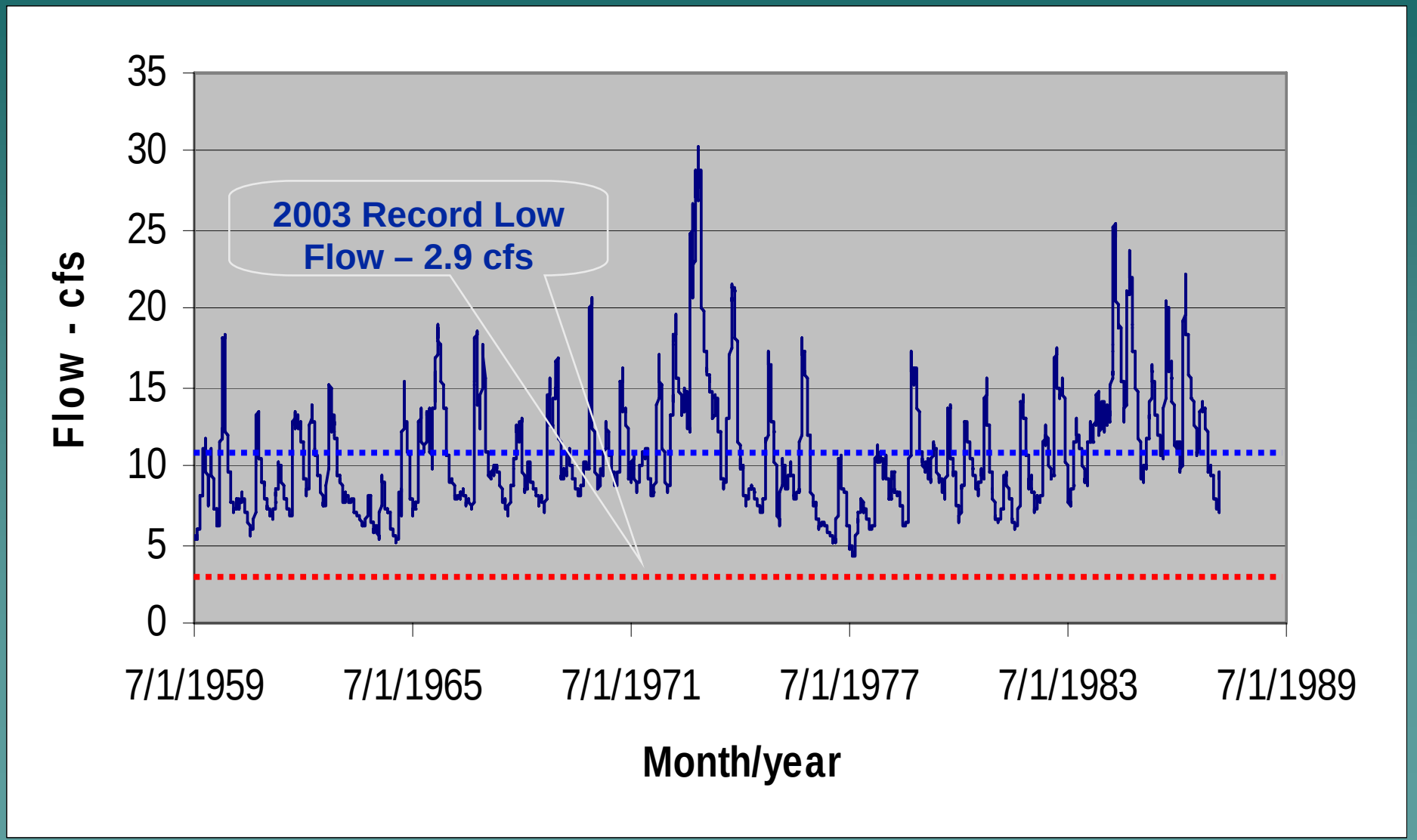


Mechenich & Kraft Flow Model (1996)

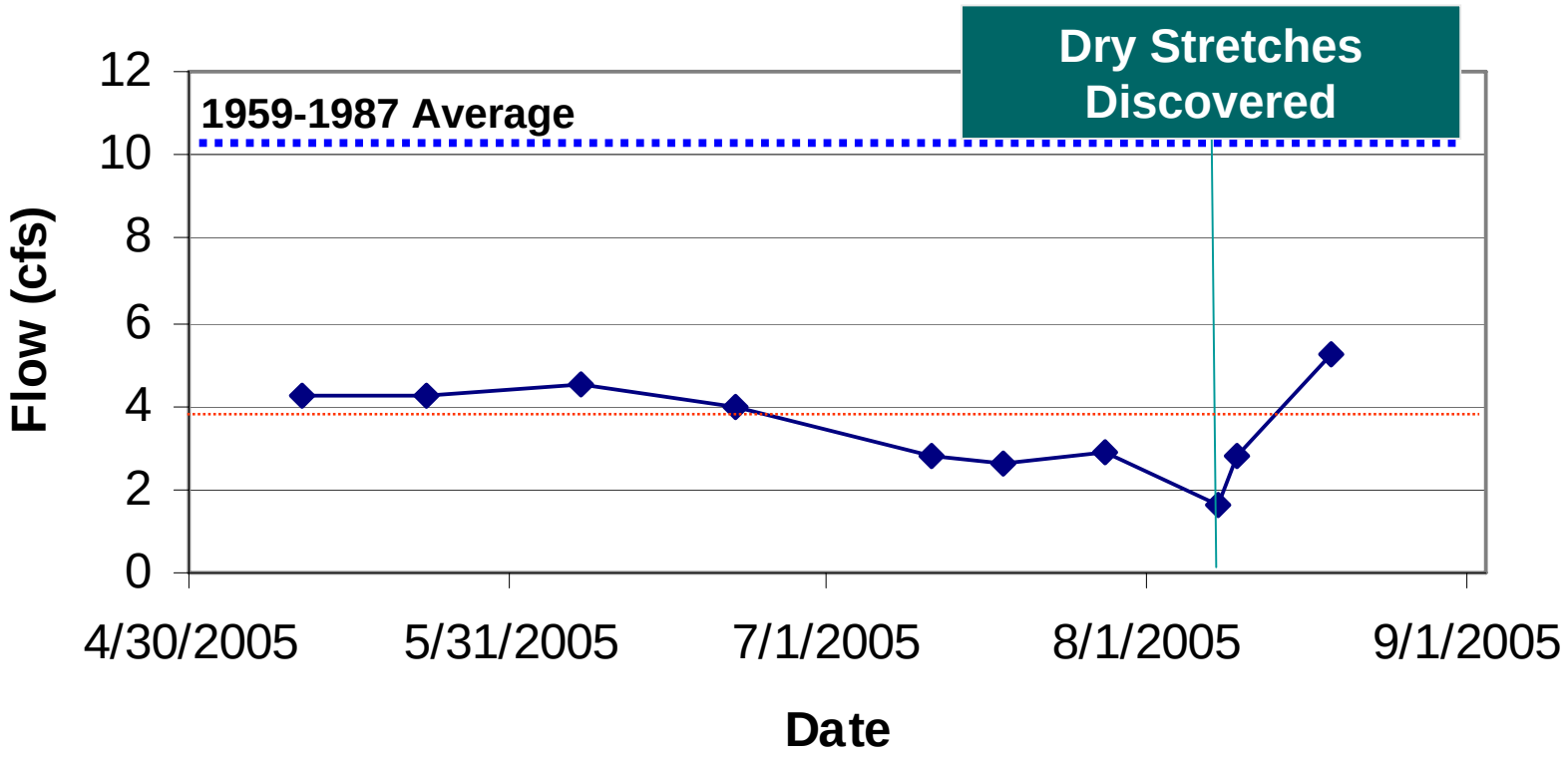


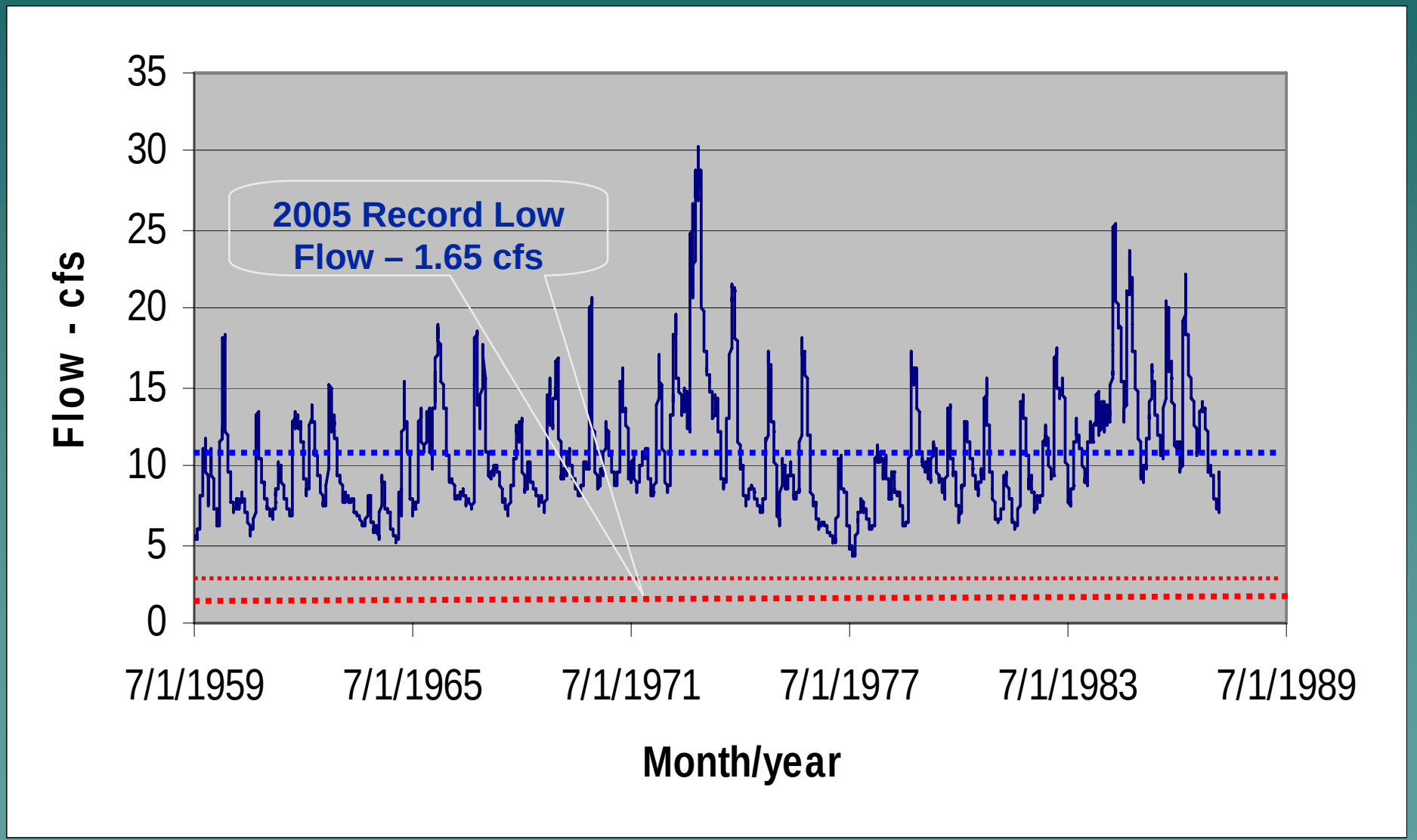
"The model predicts that the Plover wells, at their 2005 daily average [2.7 cfs], will reduce baseflow by 47% ...."

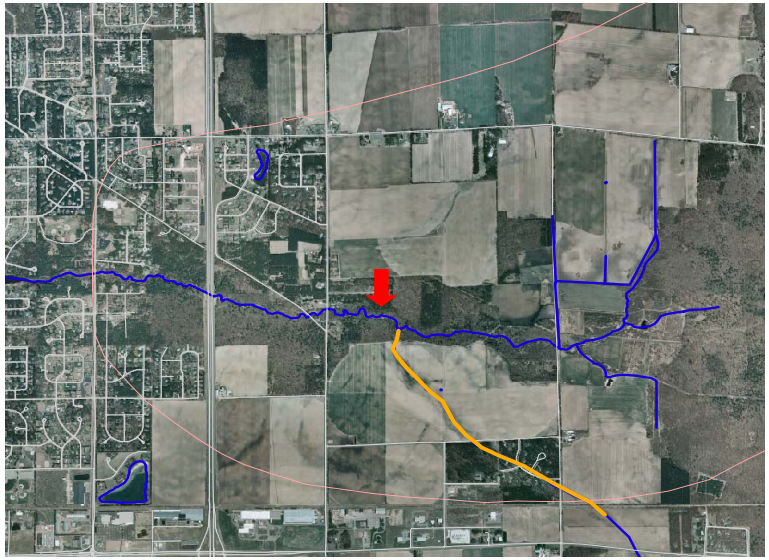
2003 Record Low Flow


2003 Record Low Flow – 2.9 cfs
Flow - cfs
35
30
25
20
15
10
5
0
7/1/1959
7/1/1965
7/1/1971
7/1/1977
7/1/1983
7/1/1989
Month/year

2005 Record Low Flow - August 9

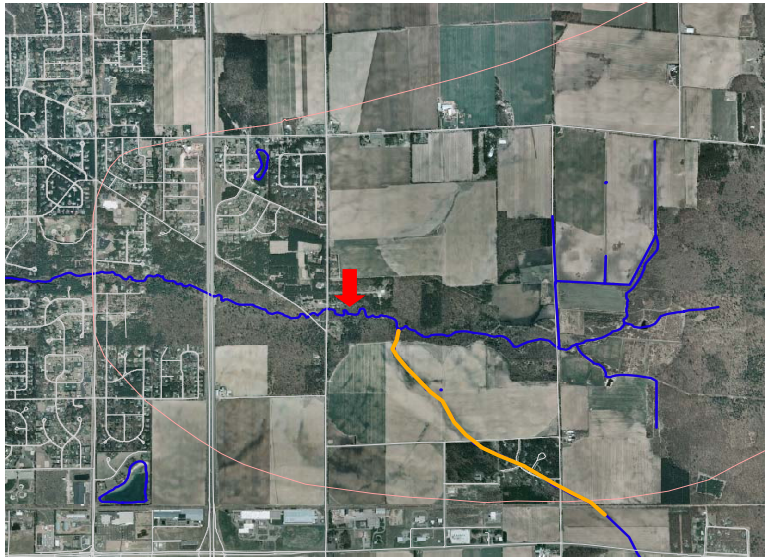


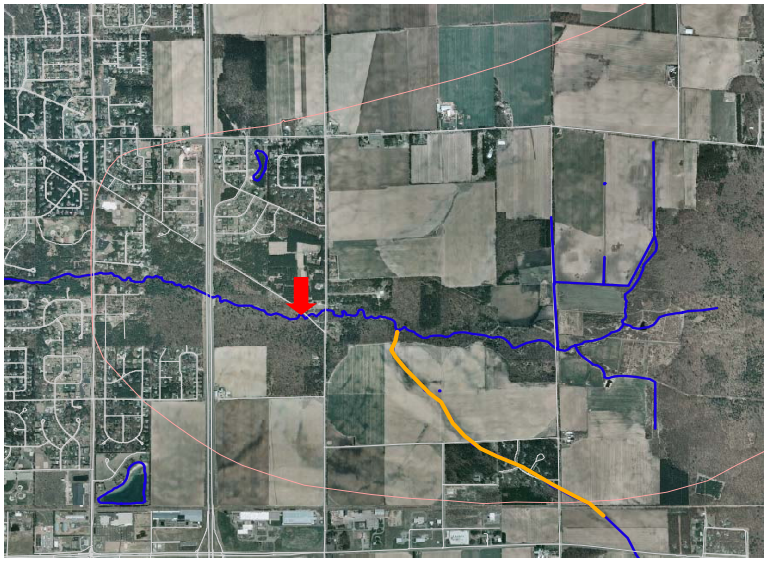

2005 Record Low
Flow – 1.65 cfs
Flow - cfs
35
30
25
20
15
10
5
0
7/1/1959
7/1/1965
7/1/1971
7/1/1977
7/1/1983
7/1/1989
Month/year



Jeremy Wisz & Bryant Browne

August 9, 2005



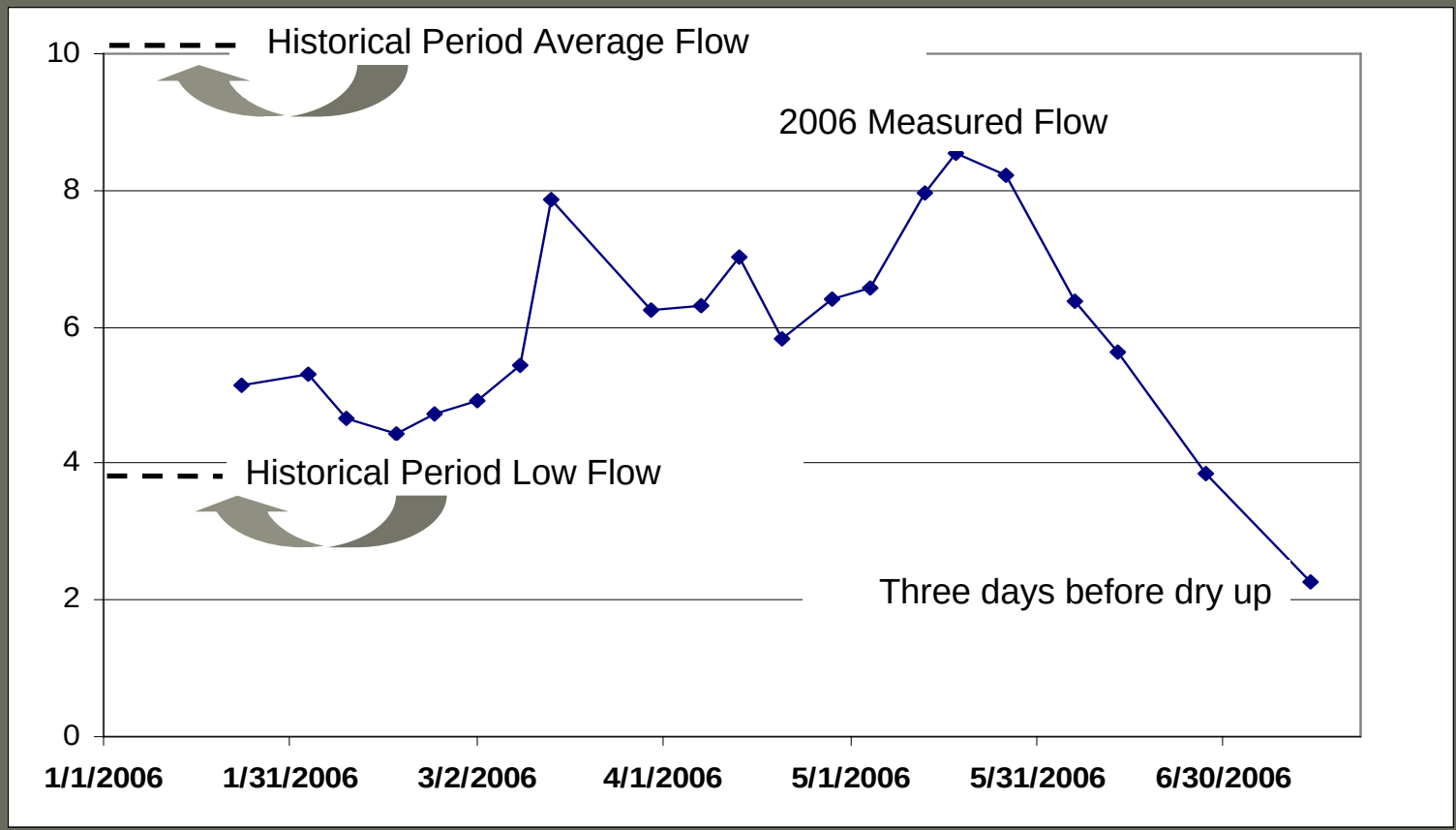


July 19 2006 Little Plover Dry-Up

Photos by Adam King and
Kyle Homan

Little Plover Flow at Hoover Rd for 2006

Baseflow in the Little Plover did not rise up to what used to be the average flow, even during the spring of 2006. Flow increased until the middle of May and then dropped rapidly.



Dry-up at Bluebird Rd, July 19, 2006

Lessons Learned ?

- Groundwater doesn’t manage itself
- Monitoring & adaptive management important
- Aside: ¼ mile GPA concept would not have protected LPR nor future LPRs